Predictive factors of postoperative Acid-Base imbalances in adult cardiac surgery

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Abstract

Introduction: Acid-base imbalances is common clinical problem in critically ill patients and those who have undergone surgery especially cardiac surgery due to cardiopulmonary bypass usage; so in this study we want to investigate the prevalence and correlation of several types of acid-base imbalances within and after cardiac surgery in adults.

Material and Methods: Fifty (34male, 16female) patients who underwent elective cardiac surgery during 3-4 months period at ShahidMadani cardiac hospital of Tabriz, Iran. Information of arterial blood gases analysis that had been taken from patients during surgery and first 24 hours of admission in intensive care unit (ICU) and demographic features of patients was recorded. Results of arterial blood gases analysis divided to metabolic acidosis, respiratory acidosis, metabolic alkalosis and respiratory alkalosis and correlation between imbalances during surgery and after that checked out. Statistical analysis were performed with T test, X^2 , fisher, multinomial logistic regression and Pearson correlation coefficient in SPSS17 software.

Results: There were 490 arterial blood gases analysis (ABG) totally that 197 of them had been taken during surgery and 293 of them in first 24 hours of admission in ICU. ABG analyses were normal in 33.3%, but in 66.7% of them one of the imbalances has been seen. There were compensation in 70% during surgery and 72% in first 24 hours in ICU that both of them are same (P=0.557). There was no correlation between acid-base imbalances before and after surgery (P=0.554). Respiratory alkalosis (37%) during surgery and metabolic alkalosis (41%) were the most common disturbances have been seen. There was no correlation between arterial PH and the duration of surgery but using of hypothermia and extended period of CPB cause acidosis temporarily.

Conclusion: Respiratory alkalosis and metabolic alkalosis are the most common acid-base disturbances during surgery and first 24 hours after that respectively. There was no correlation between acid-base imbalances before and after surgery. There was no correlation between arterial PH and the duration of surgery but using of hypothermia and extended period of CPB cause acidosis.

Keywords: Acid-base disorders, Cardiac surgery, Cardiopulmonary bypass, Respiratory buffering system, Renal buffering system